

## CHAPTER 21

# Printers

This chapter presents the PC 99 requirements and recommendations for printers. Printers and other devices attached to parallel ports should be capable of high-speed, bi-directional data transfers. The design criteria for parallel devices follows the design criteria for parallel ports as described in “Parallel Port Requirements” in Chapter 13, “I/O Ports and Devices.”

The goal of the PC 99 requirements for printers and parallel ports is to ensure the following:

- Maximum speed for transfer of parallel data between the system and the peripheral
- A true Plug and Play experience for users

**Contents**

Basic Printer Features .....	336
PC 99 Printer Design .....	337
Plug and Play for Printers .....	337
Device Drivers and Installation for Printers.....	338
Printer References.....	340
Checklist for Printers .....	340

## Basic Printer Features

This section summarizes the basic PC 99 hardware requirements for printers.

### **21.1. IEEE 1394 printer meets PC 99 requirements for IEEE 1394**

#### *Required*

The IEEE 1394 bus is recommended for support of fast, high-density data transfer. For information about implementing IEEE 1394 for PC 99, see Chapter 8, “IEEE 1394.”

NEW FOR V.0.9

### **21.2. USB printer meets PC 99 requirements for USB devices**

#### *Required*

The USB bus is a requirement for PC 99 systems. USB printers must conform to the *Universal Serial Bus Device Class Definition for Printing Devices, Version 1.0* or later. For information about implementing USB for PC 99, see Chapter 7, “USB.”

### **21.3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I**

#### *Required*

Parallel peripherals must implement nibble mode and compatibility mode. Nibble mode provides a means of transferring the identification string from the peripheral to the system. Compatibility mode provides backward compatibility with non-Plug and Play systems that do not support more advanced modes.

A parallel device complies with IEEE 1284 if it meets the required criteria documented in the IEEE 1284 specification, *Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers*. For a parallel device that connects to a PC 99 system, the minimum requirement is IEEE 1284 Level I compliance, which implements the compatibility and nibble modes as specified in IEEE 1284 and defines the mechanical and electrical specifications of the peripheral.

An IEEE 1284-I-compliant peripheral uses the standard IEEE 1284-B connector. In all cases, ensure that there is enough space between the connectors and the surrounding enclosure to allow for a mating connector, a connector shell, and a latch assembly.

For more information about the electrical specifications for IEEE 1284-I-compliant peripherals, refer to the IEEE 1284 specification.

For more information, see “Parallel Port Requirements” in Chapter 13, “I/O Ports and Devices,” which defines the following related parallel port requirements:

- Support for compatibility, nibble mode, and extended capabilities port (ECP) protocols compliant with IEEE 1284-1994
- Port connectors compliant with IEEE 1284-I, at a minimum
- Support for ECP mode compliant with IEEE 1284

NEW FOR V.0.9

Recommended: ECP mode enabled by default.

**21.4. IEEE 1284 printer meets IEEE 1284-II requirements***Recommended*

Peripheral devices capable of handling a high-speed data rate should comply with the mechanical, electrical, and protocol specification of IEEE 1284-II. In particular, such devices should support the protocols of the IEEE 1284-II ECP mode and should use the IEEE 1284-C connector.

**21.5. ECP printer works correctly when ECP mode is turned off***Required*

This ensures that the user has correct printing support when ECP mode is not in use.

**21.6. IEEE 1284 hardware supports error notification***Required*

The following minimum errors must be reported individually by the hardware:

- Out of paper
- Paper jam
- Load other paper size

**21.7. Daisy-chained parallel port device must be Plug and Play capable***Required**NEW FOR V.0.9*

The daisy-chained parallel port device must be capable of answering Plug and Play requests from the host. Because of end-of-chain issues with IEEE 1284 and IEEE 1284.3, it is also required that all pass-through devices comply with IEEE 1284.3.

## PC 99 Printer Design

This section summarizes requirements related to the PC 99 design initiatives in Part 1 of this guide.

### Plug and Play for Printers

The items in this section are requirements for Plug and Play capabilities. For Plug and Play requirements related to the printer port on the PC, see Chapter 13, “I/O Ports and Devices,” or the related bus port requirements in Part 3 of this guide.

**21.8. Implement Plug and Play support for all supported buses***Required*

Complete Plug and Play support must be implemented for all buses that the device supports. For information about the Plug and Play requirements, see the related bus-class definitions in Part 3 of this guide.

**21.9. Peripheral device meets IEEE 1284 requirements***Required*

Recommended: Support CompatibleID key in the device identification string.

These requirements include a Plug and Play device ID as described in the IEEE 1284 specification. For more information, see “Parallel Port Requirements” in Chapter 13, “I/O Ports and Devices.”

## Device Drivers and Installation for Printers

This section summarizes device driver requirements for printers. The items in this section are requirements for all PC 99 systems.

### **21.10. Printer INF file and installation meet PC 99 requirements**

#### *Required*

Each device requires a printer INF file for both Windows and Windows NT operating systems. The manufacturer does not need to supply a printer INF file if a standard printer INF file provided with the operating system can be used.

If the manufacturer provides an INF file, it must be complete and free of errors. This INF file must comply with the printer-specific extensions listed in the Windows 95 DDK and Windows NT 5.0 DDK.

If the manufacturer supplies an INF file or another file, it must comply with requirement 3.16, “Device driver and installation meet PC 99 requirements.”

### **21.11. Driver correctly reports device capabilities**

#### *Required*

The driver must correctly support the DEVMODE structure as defined in the Windows 95 DDK and Windows NT 5.0 DDK.

### **21.12. Driver supports error notification**

#### *Required*

At a minimum, the device driver must support notifying the user of errors reported by the hardware.

### **21.13. Driver supports ICC color management**

#### *Required*

Windows and Windows NT operating systems support using color profiles that comply with the ICC Profile Format specification. All color output from still-image devices must be defined. The device either must create sRGB output or must embed the ICC profile for the newly acquired image into the image file to identify the color-space information for that image.

For contact information on device profiles, see the references at the end of this chapter. The ICM APIs and functionality for Windows and Windows NT operating systems are described in the Microsoft Platform SDK and the Windows NT 5.0 DDK.

Color-capable devices such as desktop monitors, printers, scanners, still-image cameras, LCDs, color plasma displays, or other flat-panel devices are required to install one or more ICC profiles for ICM. Providing a monitor color-calibration utility is recommended for generating, editing, and installing ICC profiles. The sRGB profile will be distributed in Windows 98 and Windows NT 5.0.

### **21.14. Port monitor software meets DDK guidelines**

#### *Required*

If the device includes bi-directional port monitor software that replaces the default Windows port monitor, then this software must accurately report errors. For information about implementing port monitor software, see the Windows 95 DDK and Windows NT 5.0 DDK.

**21.15. Driver supports point-and-print network installation***Required*

This means that the user is not required to provide disks or files when installing a new printer of the same type as another printer already on the network.

**21.16. Device available immediately following installation***Required*

The user must not have to restart the system immediately after device installation in order to print.

**21.17. Device supports accurate printable regions***Required*

The printable regions that can be selected in the user interface must be accurately supported in the actual print output.

**21.18. Driver supports required DDIs***Required*

For Windows NT drivers, the device driver interfaces (DDIs) are defined in the Windows NT 5.0 DDK. Win32-based printer drivers ensure that print commands from Windows NT-based applications are executed correctly on the specified printer or plotter. Because Win32 APIs are not hardware-specific, it is the job of each printer driver to interpret the commands for its specific hardware.

For Windows drivers, this requirement includes correct support of all features advertised for the device, plus required support for Windows features. The DDIs that must be supported are listed in the “Printer Driver Overview” section of the Windows 95 DDK. This includes the following support, in addition to other support defined in the DDK:

- TrueType glyph indexes
- Big fonts (those that require more than 64K to express)
- Enhanced metafile (EMF) spooling
- Bezier curve output
- Services from the Windows device-independent bitmap (DIB) engine

**21.19. Driver based on unidriver***Recommended*

Microsoft provides a universal printer driver (unidriver) that is capable of carrying out requests such as printing text, rendering bitmaps, or advancing a page on most printer types. To build a driver for a particular printer, a developer builds a minidriver. This minidriver accepts requests from the Graphics Device Interface (GDI) and then, in most cases, passes the request to the unidriver along with information that describes the capabilities, commands, and resident fonts of the particular printer. For more information, see the Windows NT 5.0 and Windows 95 DDK.

## Printer References

The following represents some of the references, services, and tools available to help build hardware that is optimized to work with Windows operating systems.

*ICC Profile Format Specification, Version 3.4,*

International Color Consortium

<http://www.color.org>

Microsoft Windows 95 DDK, Windows 98 DDK, Windows NT 5.0 DDK, and  
Microsoft Platform SDK

MSDN Professional membership

*Standard Signaling Method for a Bi-directional Parallel Peripheral Interface  
for Personal Computers* (IEEE 1284 specification)

ASK\*IEEE

Phone: (800) 949-4333

Fax: (212) 310-4091

Global Engineering Documents

Fax: (303) 397-2740

Phone: (800) 854-7179 (US)

(613) 237-4250 (Canada)

(303) 792-2181 (Outside North America)

*Universal Serial Bus Device Class Definition for Printing Devices, Version 1.0*

<http://www.usb.org>

## Checklist for Printers

If a recommended feature is implemented, it must meet the PC 99 requirements for that feature as defined in this document.

*21.1. IEEE 1394 printer meets PC 99 requirements for IEEE 1394*

*Required*

*21.2. USB printer meets PC 99 requirements for USB devices*

*Required*

*21.3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with  
IEEE 1284-I*

*Required*

*21.4. IEEE 1284 printer meets IEEE 1284-II requirements*

*Recommended*

*21.5. ECP printer works correctly when ECP mode is turned off*

*Required*

*21.6. IEEE 1284 hardware supports error notification*

*Required*

*21.7. Daisy-chained parallel port device must be Plug and Play capable*

*Required*

*21.8. Implement Plug and Play support for all supported buses*

*Required*

*21.9. Peripheral device meets IEEE 1284 requirements*

*Required*

*21.10. Printer INF file and installation meet PC 99 requirements*

*Required*

*21.11. Driver correctly reports device capabilities*

*Required*

- 21.12. Driver supports error notification*  
*Required*
- 21.13. Driver supports ICC color management*  
*Required*
- 21.14. Port monitor software meets DDK guidelines*  
*Required*
- 21.15. Driver supports point-and-print network installation*  
*Required*
- 21.16. Device available immediately following installation*  
*Required*
- 21.17. Device supports accurate printable regions*  
*Required*
- 21.18. Driver supports required DDIs*  
*Required*
- 21.19. Driver based on unidriver*  
*Recommended*

